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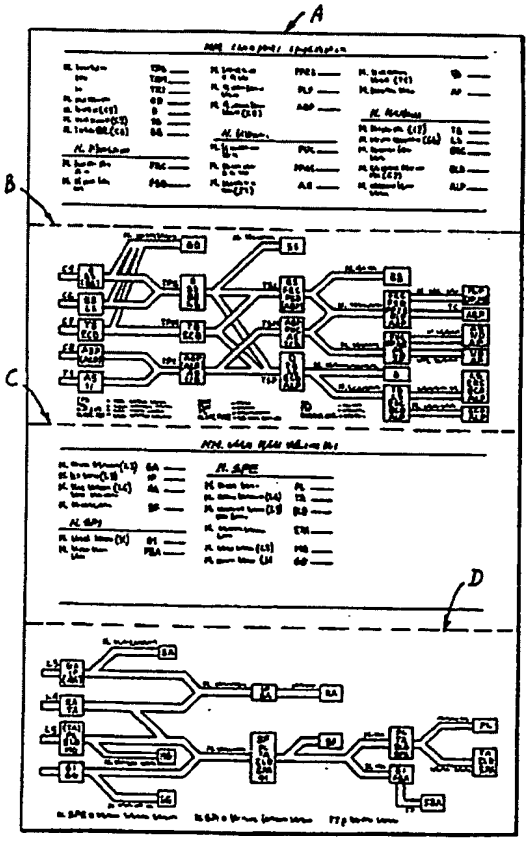
(54) Title: POCKET CHART FOR LOCALIZING LESIONS OF THE PERIPHERAL NERVOUS SYSTEM

(57) Abstract

The present invention refers to a pocket chart for localizing lesions of the peripheral nervous system, consisting of a flexible card divided in four sections, indicated respectively with A, B, C and D, wherein section A lists the test muscles for the innervation of the upper extremity, section B shows the consultation graph for locating the nerve lesion in the area of the brachial plexus, section C lists the test muscles for the innervation of the lower extremity, and section D shows the consultation graph for locating the nerve lesion in the lumbosacral plexus area.



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POCKET CHART FOR LOCALIZING LESIONS OF THE PERIPHERAL NERVOUS SYSTEM.

Description

The present invention refers to a pocket chart for localizing lesions of the peripheral nervous system in the area of brachial- and lumbosacral plexus distribution.

Said chart has the advantage of being a handy tool of rapid use for a safe diagnosis of the location of a nerve lesion, which constitutes the basis for an adequate prognosis and therapy strategy.

Thus an aid is given to the physician, be he a specialist (neurologist, neurosurgeon, physiatrist, orthopedist) or a general practitioner, for acquiring a correct orientation in such pathologies.

In particular, it is possible, by means of the chart according to the invention, through the examination of a number of the member muscles and of their normal or pathological condition, which can be evaluated from a correct clinical muscle balance or from the analytical report of an accurate electromyographic examination, to establish the location of the possible nerve lesion without the laborious and time consuming consultation of more or less exhaustive textbooks, which only report the simple anatomical distribution of the nervous fibers.

The chart of the invention allows thus to bypass the task of combining the study, in the books, of the anatomy and functionality

of the brachial- or lumbosacral plexus with the clinical electromyographic examination of the patient. In practice it is often problematic, through the synthesis of said two elements, to reach a rapid diagnostic conclusion, while the use of the chart according to the invention permits to immediately integrate the two elements.

The characteristics and advantages of the chart according to the invention will be further illustrated in the following detailed description.

With reference to the enclosed figures 1 and 2, the chart consists of a flexible card divided into four sections designed respectively as A, B, C and D.

In section A are listed the test muscles for the innervation of the upper extremity, in section B the consultation graph for locating the nerve lesion in the area of the brachial plexus is reported, in section C are listed the test muscles for the innervation of the lower extremity and in section D a consultation graph for locating the nerve lesion in the lumbosacral plexus area is reported.

We are calling the attention to the fact that, as test muscles of the radicular innervation, those muscles are considered which, in most individuals, are prevailingly innervated by nervous fibers coming from a motor root; their, normal or pathological, situation may therefore be considered a test of the functionality of the root itself. For the trunk innervation not all muscles are considered, but a number of them sufficient to allow to locate not only a

lesion of the main trunk but also of its single ramifications.

Considering the test muscles for the upper extremity innervation listed in section A, those for radicular innervation are in heavy type, with the respective motor root in parenthesis, while the muscles innervated by the three main trunks (median, ulnar and radial) are grouped separately, mainly for the sake of mnemonics. The muscles are indicated both with their names in extenso and with the initials, which are reported also in the consultation graph of section B.

In section B we represent the distribution graph of the brachial plexus indicating, from left to right, the motor roots and the various nervous trunks that are gradually formed down to their terminal ramifications. In the lower part of section B the various abbreviations are listed.

More particularly, the brachial plexus is represented in the successive stages at which the mixing takes place of the nervous fibers coming from motor roots (C_5-T_1) and which converge to form the primary trunks, which on their turn subdivide to form secondary trunks from which last the peripheral trunks and the single terminal ramifications originate.

For each stage are marked in apposite cases the initials of the various muscles the deficit of which may allow to locate the lesion at that very point; the site of the lesion is given by the level of the case in which all and only the deteriorated muscles are comprised.

Because of the complexity of the brachial plexus, while only a few muscles are considered for the radicular levels, those at trunk level are more numerous, often being muscles with such a multiple root innervation as to indicate a clear deficit only in the lesions of single nervous trunks.

The evaluation of the muscle functionality is expressed in a numerical scale in which 5 indicates normality and 0 the total absence of motion, the intermediate deficit degrees being indicated with numbers between 0 and 5. As an example, let's consider a patient showing a marked deficit (indicated with 2) of the deltoid-, triceps brachii-, brachioradialis-, extensor digitorum-, abductor pollicis longus-muscle. This situation is represented in the following table 1 which reproduces section A of fig. 1. In the third and in the sixth column the functionality evaluations for the various muscles are reported.

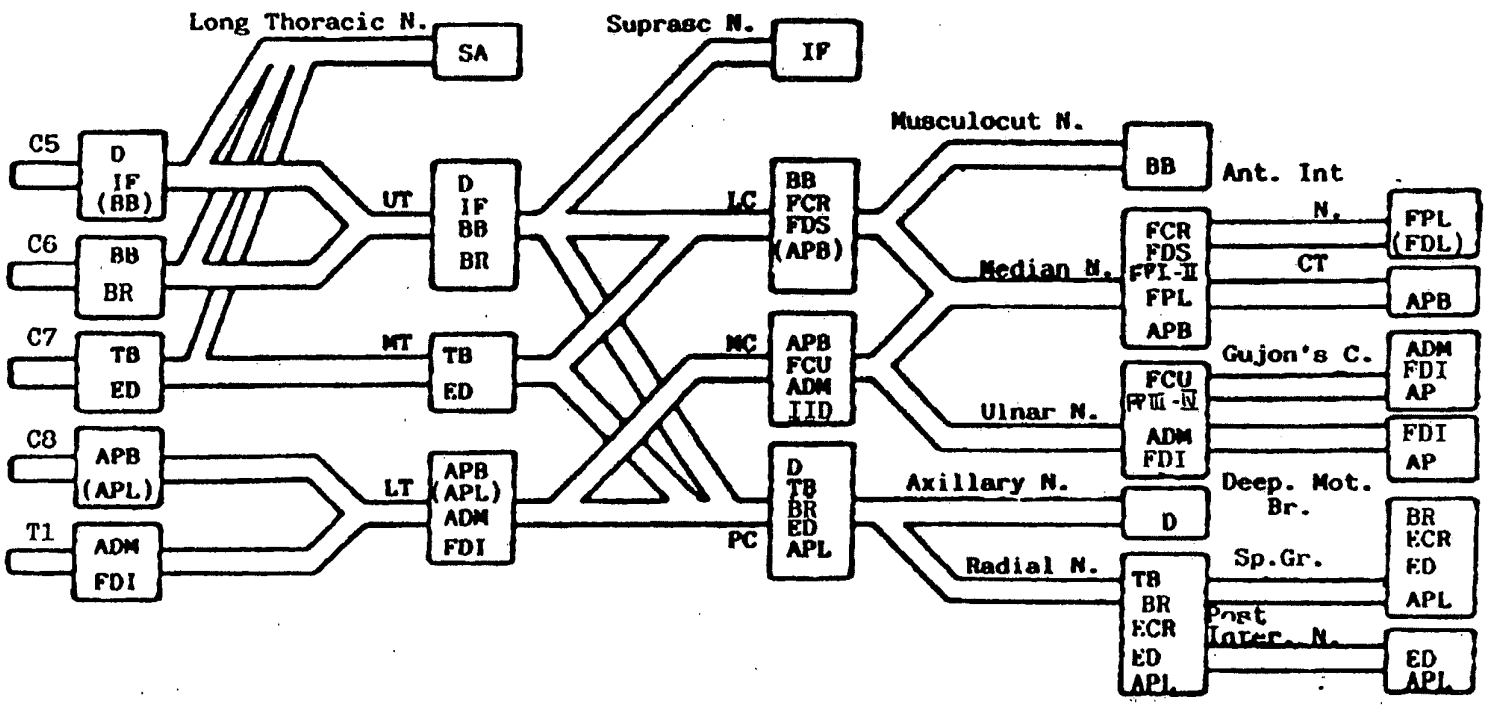
TABLE 1: Test muscles, upper extremity

Upper Trapezius	UT	5	Ulnar N.		5
Median "	MT	5	Flexor Carpi Ulnaris	FCU	5
Lower "	LT	5	Flexor Digitorum Profundus III-IV	FP III-IV	5
Serratus Anterior	SA	5	Abductor Digiti minimi	ADM	5
Deltoid (C5)	D	2	First Dorsal Interosseus	FDI	5
Infraspinatus (C5)	IF	5	Adductor Pollicis	AP	5
Biceps Br. (C6)	BB	5	Radialis N.		
Median N.			Triceps Br.(C7)	TB	2
Flexor Carpi Rad.	FCR	5	Brachioradialis (C6)	BR	2
Flexor Digitorum Sup.	FDS	5	Extensor Carpi Rad.	ECR	2
Flexor Digitorum Profundus I-II	FP I+II	5	Extensor Digitorum	ED	2
Flexor Pollicis Longus	FPL	5	Abductor Pollicis Longus	APL	2
Abductor Pollicis Brevis	APB	5			

0=no contraction; 1=Flicker or trace of contraction; 2=Active movement with gravity eliminated; 3=Active movement against gravity; 4=Active movement against gravity and resistance; 5=Normal power

The related lesion site is identified in the case which contains all and only the deteriorated muscles of diagram 1 which reproduces section B of fig. 1.

DIAGRAM 1



UT = Upper Trunk
LC = Lateral Cord
M. Cut. N. = Musculocutaneous N.
Ant. Int. N. = Anterior Interosseus N.

MT = Middle Trunk
MC = Medial Cord
CT = Carpal Tunnel
Post. Int. N. = Posterior Interosseus N.

LT = Lower Trunk
PC = Posterior Cord
Sp. Gr. = Spiral Groove

In the specific examples the lesion is located in correspondence of the brachial plexus posterior cord (PC).

In another case, the patient shows a deficit of the brachioradialis-(BR), extensor carpi radialis- (ECR), extensor digitorum-(ED); abductor Pollicis Longus- (APL) muscles.

In diagram 1 one finds that said muscles are grouped in the case corresponding to the spiral groove and therefore the lesion site is the radial nerve at the level of the spiral groove.

In section C of figure 1 are listed the test muscles for the lower extremity innervation and in section D a graph of the lumbosacral plexus distribution is represented.

For this sections the considerations made for section A and B apply, both as to the interpretation and the use for diagnostic ends.

In the following table 2 the list of section C is reproduced.

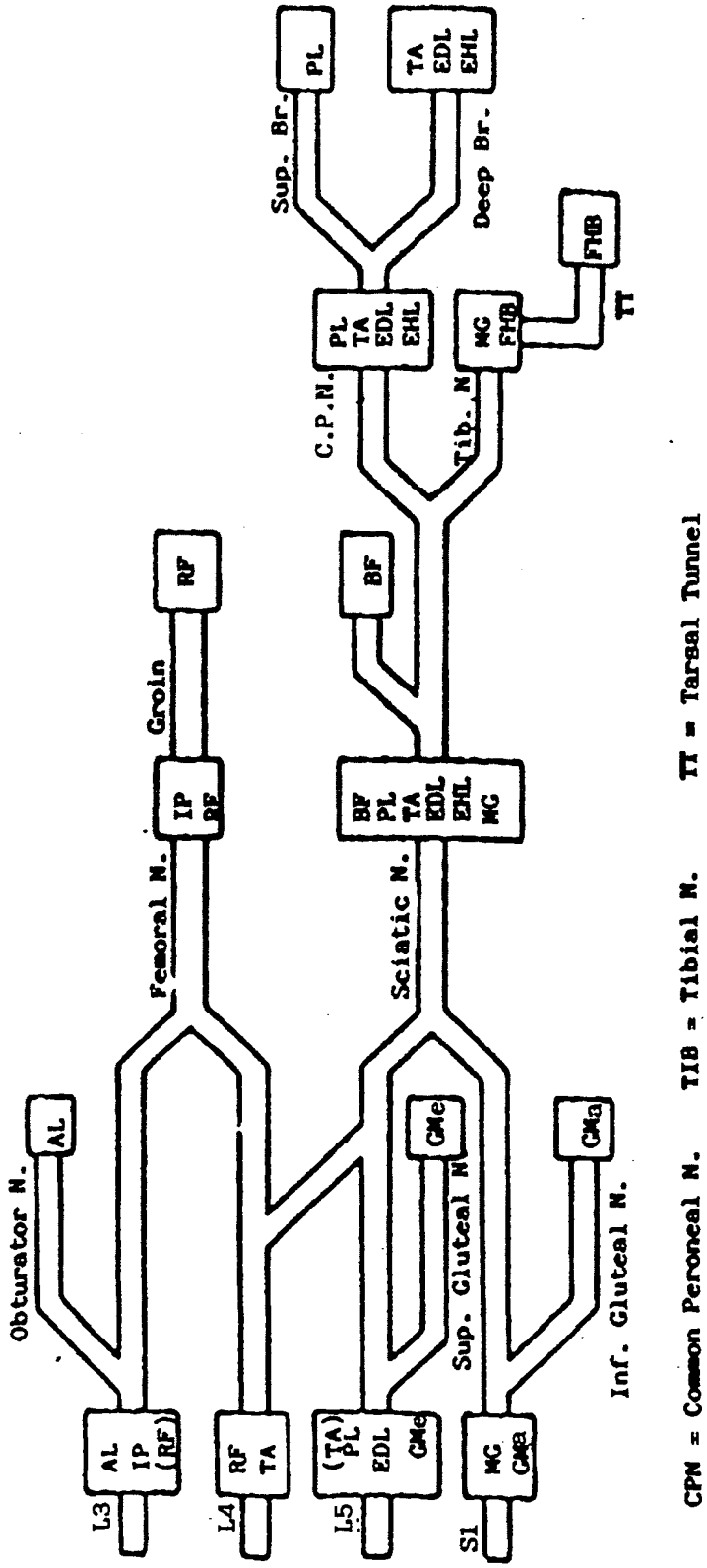
TABLE 2

TEST MUSCLES LOWER EXTREMITY

Adductor Longus (L3)	AL	Common Peroneal N.		
Iliopsoas (L3)	IP	Peroneus longus	PL	
Rectus Femoris (L4)	RF	Tibialis Anterior	TA	
Biceps Femoris	BF	Extensor Digitorum Longus (L5)	EDL	
Tibial N.		Extensor Hallucis Longus	EHL	
Medial Gastoonemius	MG	Gluteus medius	GMe	
Flexor Hallucis Brevis	FHB	Gluteus maximus	GMa	

Diagram 2 reproduces the graph of section B.

DIAGRAM 2



CPN = Common Peroneal N. TIB = Tibial N. TT = Tarsal Tunnel

On the back of the foldable card of the present invention schematic drawings of the brachial- and of the lumbosacral- plexus are reported with the indication of the various nerve trunks, the summary of its contents as well as the instructions for its use.

CLAIMS

1. A pocket chart for localizing lesions of the peripheral nervous system, consisting of a flexible card divided in four sections, indicated respectively with A, B, C and D, characterized in that section A lists the test muscles for the innervation of the upper extremity, section B shows the consultation graph for locating the nerve lesion in the area of the brachial plexus, section C lists the test muscles for the innervation of the lower extremity, and section D shows the consultation graph for locating the nerve lesion in the lumbosacral plexus area.

2. Chart according to claim 1, characterized in that in section A and C the respective muscles are reported both with their names in extenso and with their initials which are reported also in the consultation graphs in sections B and D.

3. Chart according to claim 1, characterized in that sections B and D represent from left to right the brachial- respectively lumbo-sacral plexus distribution in the various stages starting from the various nervous trunk roots that are gradually formed down to their terminal ramifications.

4. Chart according to claim 1, characterized in that for each stage the pertinent cases contain the initials of the various muscles the deficit of which nay allow to locate the site of the lesion at the same level.

5. Chart according to the preceding claims, characterized in that the lesion site is given by the level of the case in which all and

only the deteriorated muscles are comprised.

6. Pocket chart for localizing lesions of the peripheral nervous system according to claims 1 to 5 and as more amply described and illustrated and for the specified ends.

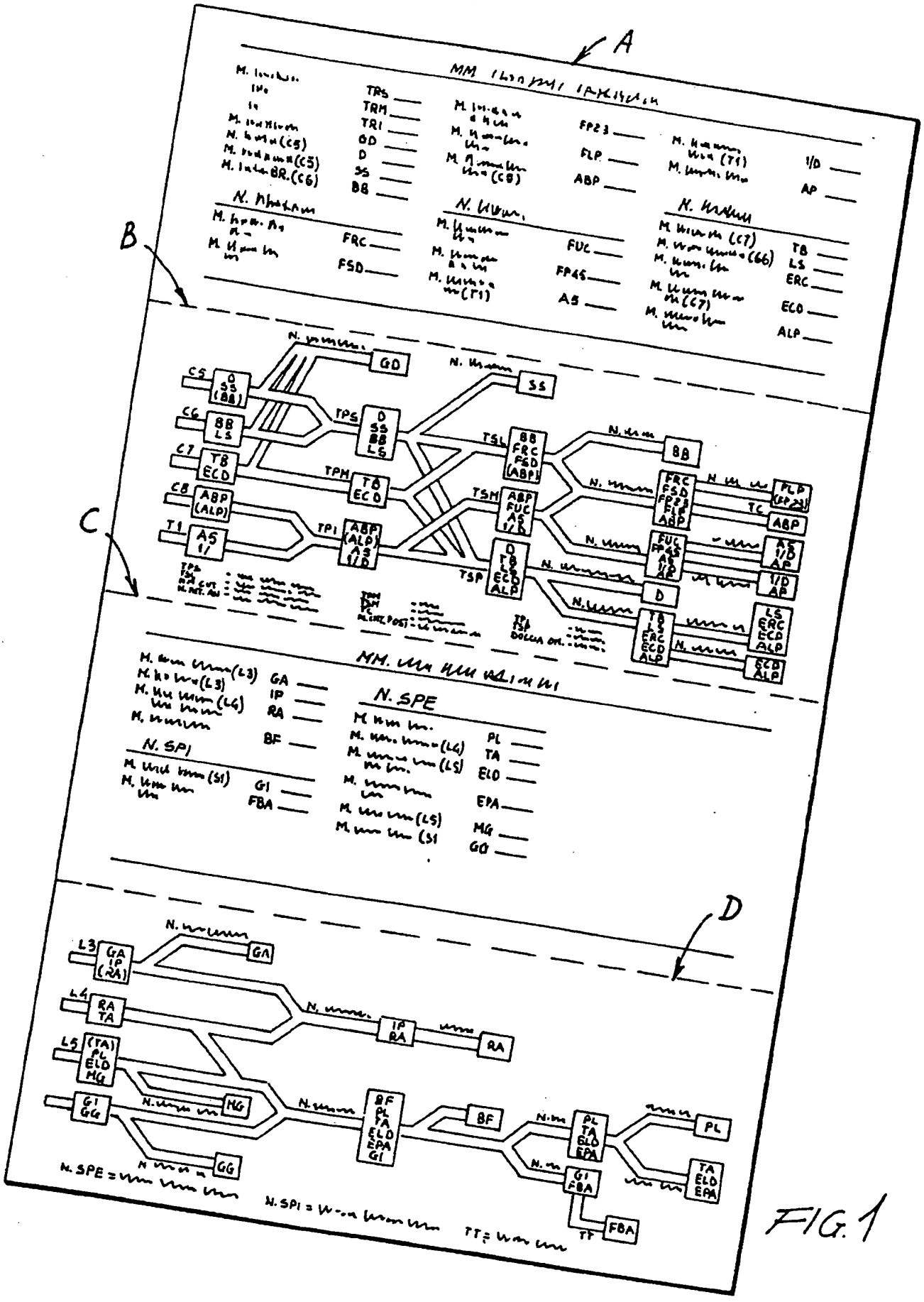

A
B
C
D
TRS
TRM
TRI
OD
D
SS
BB
FRC
FSD
FUC
AS
FP23
FLP
ABP
FP45
TB
LS
ERC
ECD
ALP
1/D
AP
GA
IP
RA
BF
GI
FBA
PL
TA
ELD
EPA
MG
GG
N. SPE
N. SPI
TT

FIG. 1

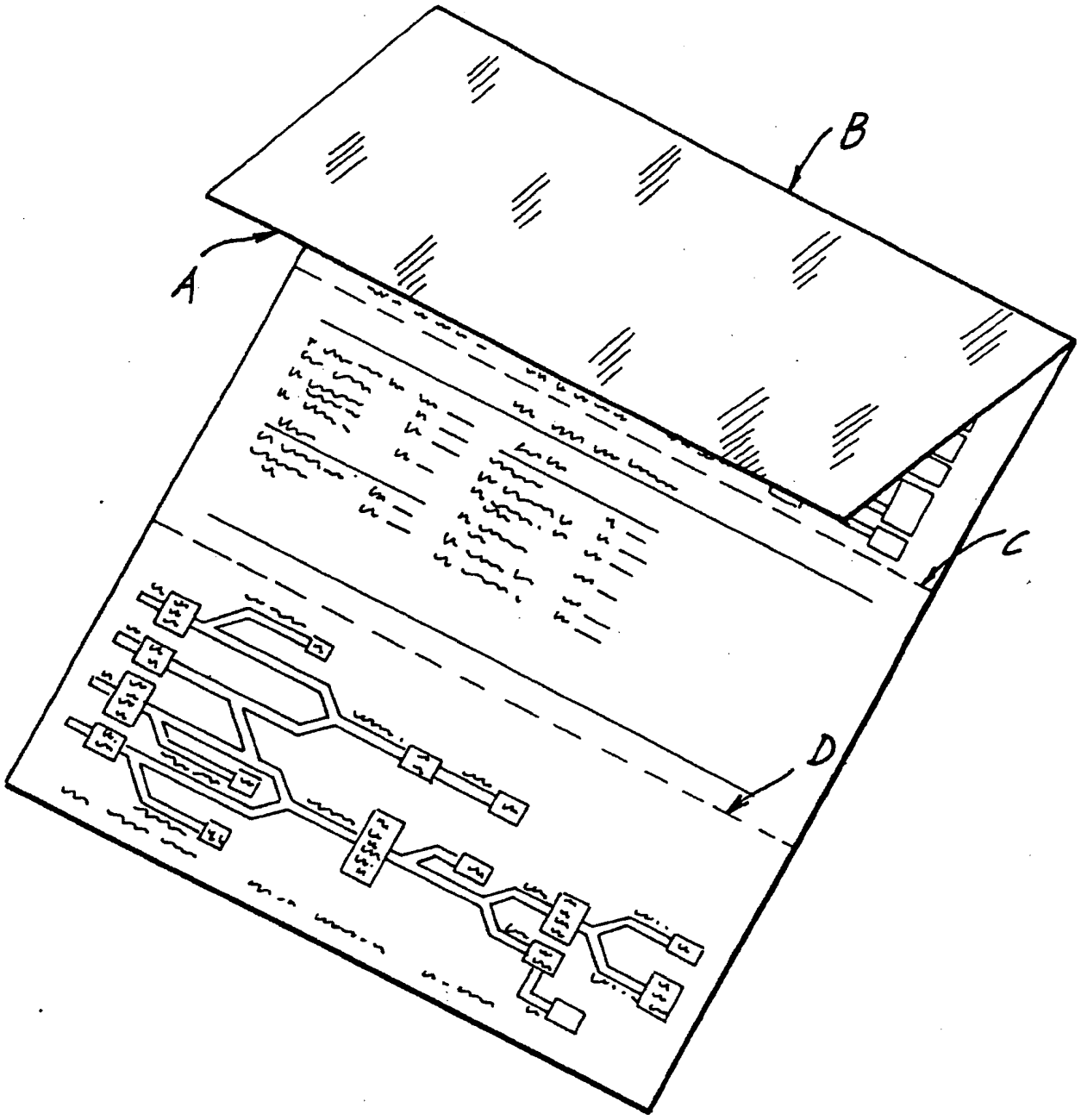


FIG. 2

INTERNATIONAL SEARCH REPORT

International Application No PCT/EP 90/02232

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 A61B5/00 ; G09B3/04

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
Int.Cl. 5	A61B ; G09B ; B42D

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category °	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No.[13]
A	EP,A,239314 (V. KUMAR-MISIR) 30 September 1987 see column 1, line 22 - column 3, line 55; figures	1
A	FR,A,2563162 (J. GANDOIS) 25 October 1985 see claims 1-3; figures; abrégé;	1

° Special categories of cited documents : [10]

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
04 APRIL 1991	25. 04. 91
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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.

EP9002232
SA 42762

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EP-A-239314	30-09-87	US-A- 4811973	14-03-89
FR-A-2563162	25-10-85	None	